

### aeromet

MONTHLY PROGRESS REPORT NO. 22

for the period December 1-31, 1977

to

ENVIRONMENTAL PROTECTION AGENCY

REGION VIII

1860 Lincoln St., Suite 900 Denver, CO 80203

Contract No. 68-01-1946

Utah U-a/U-b Tract

aeromet inc.

P.O. BOX 45447 953 TULSA, OKLAHOMA 74145

9535 E. 47th PLACE 918-664-4547

> 7800534 MAR 13 1978

TN 859



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Contract No. 62-01-1046

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#### 1.0 INTRODUCTION

Low level temperature and wind data were collected for December, 1977 at Bonanza, Utah. The data were collected using a 30 gm helium filled pilot balloon with a temperature sonde attached, a single theodolite and a TSR-2 receiver/recorder twice a day every other day. The observations were scheduled for ½ hour after sunrise and 1400L.

The pilot balloon had an ascent rate of 500 ft/min and was tracked by a single theodolite for 12 minutes with the azimuth and elevation angles recorded every 30 seconds on a cassette tape recorder. The tape was transcribed to a pilot balloon form after the observation.

The temperature sonde operated at 403 MHz and the signal was received by a ground plane antenna at least 16 ft AGL which was attached to the Aeromet, Inc. TSR-2 receiver/recorder. The TSR-2 receiver has a built-in Rustrak strip chart recorder and the temperature was recorded within the range from -50°C to +50°C. A baseline temperature calibration was performed with each T-Sonde by the adjustment of the recorded temperature to match the thermometer measured temperature next to the transmitting sonde. Once the calibration check was finished the balloon was released with the sonde attached and the temperature was recorded for at least 20 minutes. At the completion of each observation the data were mailed to Aeromet, Inc.

The collected temperature and wind data are accurate and have not been edited unless otherwise stated in the Pilot Balloon Summary Section. However, the obvious errors sometimes found in the recorded azimuth and elevation angles are corrected without mention. For example, the sequence of azimuth angles . . . 76.6, 75.3, 47.8, 73.8 . . . can be corrected without ambiguity. The more ambiguous errors are brought to the attention of the reader if editing has been performed, otherwise, the data are left as recorded and the filtering is left to the individual user. An example is the wind profile for Hanksville on 06/29/76 at 1300 MST found in the Monthly Progress Report No. 4. The azimuth angles starting 30 seconds after the launch and incremented by the same are as follows . . . 109.0, 110.0, 110.0, 281.0, 280.0, 282.0 . . . , while the corresponding elevation angles are as follows . . . 60.0, 57.6, 58.7, 58.6, 52.7, 44.3 . . . . The wind speed and direction change dramatically over the interval as can be seen in the report since these data were not edited.

Low level temperature and wind oata were collected for December, 1977 at Bonenza, Utah. The data were cultected using a 30 gm heltom filled pilot palloon with a temperature sonde attached, a single thand-plite and a TSA-2 receiver/recorder twice a day every other day. The observations were scheduled for a hour after subrise and 1400L.

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The temperature some operated at 403 Wiz and the signal was received by a ground plane antenna as loss in it AGL which was attached to the Aeromet. Inc. 158-2 receiver has a tuiltien Rustrak strip chart recorder and the temperature was recorded within the range from -50 C to 350 C. A baseline temperature calibration was performed with each 1-sonde by the adjoinent of the recorded temperature to match the theremeter coasses of temperature nest to the transmitting sonde. Once the talibration check was finished the balloon was released with the sonde attached and the temperature was recorded for at less 20 minutes. At the completion of each observation the data were mailed to Aeromet. Inc.

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109.0, 110.0, 110.0, 201.0, 201.0, 200.0, 27.6, 57.5, 58.6, 52.7, 44.3 clevation angles are as follows.

109.0, 100.0, 100.0, 100.0, 201.0, 201.0, 200.0, 57.6, 58.7, 58.6, 52.7, 44.3 clevation angles are as follows.

200.0, 50.0, 50.0, 50.0, 50.0, 50.0, 50.0, 57.6, 58.7, 58.6, 52.7, 44.3 clevation angles are as follows.

200.0, 50.0, 50.0, 50.0, 50.0, 50.0, 50.0, 57.6, 58.7, 58.6, 52.7, 44.3 clevation angles are as follows.

200.0, 50.0,

#### 2.0 DATA SUMMARY

#### 2.1 Utah U-a/U-b Bonanza Field Summary

During the month of December the observer attempted 41% of the scheduled launches resulting in 41% recovery of the temperature data and 32% recovery of the wind data. It first became evident that the observer was not releasing the pibals as scheduled in mid December as only 63% of the launches had been performed. Aeromet contacted the observer and was assured that all equipment was working properly and that the balloons were being released. The observer never indicated a desire to discontinue with the project; however, during the last two weeks of December Aeromet received data for only three additional launches.

#### 2.1 Utah U-artish Bonamer Field Soundry

During the conti of the chartes the observer attemperature dots and according land of the temperature dots and all recovery of the temperature dots and according to the continue of the temperature dots and the parties of continued the mid continued the observer and was assured that all configurations was appropriate the observer and was assured that the observer and was were being released. Incomment was appropriate the fact that the being to discontinue with the project; however, during the last the desire to discontinue received data for only three best the desire to discontinued with the project; however, during the last the desire to discontinued with the project; however, during the last the desire of December According

#### 2.2 Mixing Layer Height

The average mixing layer height was computed for the morning and afternoon based on the morning and 1400L temperature soundings. The balloon release 1/2 hour after sunrise is near enough to the minimum temperature to assume the correctness of the calculated mixing layer heights. The afternoon balloon release is generally not at the time of maximum heating and the user of the mixing layer height data must be aware that minor changes in the calculated values can be expected. Without equipping the field sites with minimum/maximum thermometers the extrapolation of the afternoon data can not be justified in establishing a data base for statistical analysis. The approximation of the afternoon maximum temperature would be a "calculated guess" for there are: 1) local effects which are to be determined and would be filtered out with extrapolation, 2) mountain effects which alter the lower 1500m (e.g. downslope effects), and 3) meteorological effects which can alter the expected change in the sounding (e.g. advection, moisture, etc.).

It is felt that to better define the mixing layer height that a variety of "heat island" effects should be viewed. The rigorous method would be to define 15 "heat island" effects ranging from 0 to 14°C and let the user decide which would best serve his needs. However, for these analyses 0°, +5° and +10° "heat island" effects are calculated and listed for the morning and afternoon soundings in the table Average Mixing Layer Height.

The symbol N/D means that no mixing layer height was defined and sfc is the abbreviation for surface.

#### 2.3 Stability and Inversion Classification

The temperature and wind data were edited to remove data felt to cause anomalous results in the stability and inversion classification schemes. Only the stations listed prior to the table classifying the inversions were used in the calculations.

The balloon release to now the despite and 1800, tenmerature sounding and afternoon based on the despite and 1800, tenmerature sounding.

The balloon release to how after burning is now enough to the minimum temperature to assume the correctness of the calculated mixing layer heights. The afternoon balloon release is generally not at the time of maximum reading and the carrier of the mixing layer height date must be aware that more control in the calculated values can date must be aware that more control after the date with minimum/meximate the avairable to the site of the afternoon date can got the justified in estimation a date base for statistical analysis. The approximation of the afternoon maximum temperature would be a determined and would be of the afternoon maximum temperature would be a calculated quess for the afternoon maximum temperature would be a calculated quess for the afternoon maximum temperature would be a mountain effects which are to be determined and would be of the relieves which extrapolation. 2) effects in effects which are the countain effects which can after the expected change in the sounding is facts which can after the expected change in the sounding is facts which can after the expected change in the sounding is stated and would be a determined and would be a stated change in the sounding is facts which can after the expected change in the sounding is stated and advention, moisture, act.)

that a variety of "host to bette define the mixing layer height that a variety of "host island" effects about he viewed. The rigorous method would be to define 15 "hear island" effects ranging from 0 to 14 % and let the user merids would most serve his needs. However, for these analyses 0 , is sad will "heat island" effects are calculated and instead for the user majoring and afternoon soundings in the table Average Mixing Layer Height.

The symbol MAD posses that no mixing layer height was defined and size in the abbreviation for sweezes

2.3 Stability and Inversion Classification

The temperature and wind data many missed to remove data felt to cause showed but results in the stations live and inversion Classification schemes. Only the stations lived prior to the table classification the inversions were used in the calculations.

#### 3.1 Printed and Plotted Output

Wind speeds and directions are computed from the azimuth and elevation angles measured while tracking the balloon with the theodolite. The wind speed and direction are plotted versus height and printed out at 30 second intervals. The printed output includes the AGL and MSL height of the calculated wind value and the orthogonal components of the wind. The wind data are also written to magnetic tape.

The temperature data are processed and plotted with the temperature and the lapse rate per 300 meters versus height at 15 second intervals. Tic marks are placed on the temperature plot at significant levels. A solid line to the right side of the plot indicates the data for that layer are interpolated temperature values. The temperature data are also printed out and recorded on magnetic tape. The asterisk beside a height value indicates a significant level while a "?" indicates interpolated data.

The temperature data are also processed to produce a monthly summary of inversion layers and lapse rates within the inversions and from the inversion base to the surface by means of the Holzworth classification scheme for inversions (Holzworth, G. C., 1974: "Climatological Data on Atmospheric Stability in the United States". Paper presented at the American Meteorological Society Symposium on Atmospheric Diffusion and Air Pollution, September 9-13, 1974. Santa Barbara, California.)

The temperature and wind data are processed together to produce a monthly average bivariate frequency distribution of wind direction versus wind speed represented in the 500m layer adjacent to the ground. The distribution is presented by the six Pasquill stability classes (A-F) and a summary independent of stability. If the  $\Delta T/100m$  criterion is met but the wind speed criterion is not met, then the wind data are checked

STABILITY CLASS	ΔT (°C/100m)	WIND SPEED
A B C	<-1.9 -1.91.7 -1.71.5	<2 <5 <6
D E F	-1.50.5 -0.5 - 1.5 >1.5	ALL SPEEDS <pre></pre>

against the criterion for the next stability class, always cascading to the D stability class. Once the wind speed criterion is met the data are classified under the new stability class even though now the lapse rate exceeds the class criterion. For example, if the  $\Delta T/100m$  value is



1.7 and the wind speed is 7 m/s, the lapse rate criterion is met for the stability class F, however the wind speed criterion is exceeded. The wind speed is greater than the 5 m/s maximum limit for class E but falls within the criterion of class D, which includes all wind speeds. As a result the observational data with a  $\Delta T$  value of 1.7 C/100 m and a wind speed value of 7 m/s are classified under stability class D, not class F.

The data are also punched on computer cards in a format compatible with the STAR PROGRAM of the National Climatic Center, NOAA, U.S. Department of Commerce.



#### 3.2 Punched Output

The punched output from the bivariate frequency distribution calculations include a header card as illustrated below, and the

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punched distribution data for each wind direction under each stability class in agreement with the "star" output. The stability classes are number coded as follows:

STABILITY CLASS	NUMBER	CODE
A	1	
В	2	
С	3	
D	4	
<u>E</u>	5	
F	6	
Independent of Stability	/	

The station I.D. numbers are as follows:

STATION	I.D.	NUMBER
Casper, Wyoming		1
Colorado C-b Tract		2
Craig, Colorado		3
Escalante, Utah		4
Hanksville, Utah		5
Rock Springs, Wyoming		6
Utah U-a/U-b Tract		7



The month and season number codes are as follows:

MONTH 1-12 SEASON 13 = DJF 14 = MAM 15 = JJA 16 = SON ANNUAL 17



## PILOT BALLOON SUMMARY Utah U-a/U-b December, 1977

Observer missed launch.

AFTN

0726

December 1

			values were interpolated over the interval from 1/4 to 1 1/2 minutes.					Temperature values were interpolated over the intervals from 9 1/2 to 12 1/2 minutes, 18 1/2 to 21 1/4 minutes, 26 1/2 to 28 1/4 minutes, and 29 1/2 to 30 1/2 minutes. No wind data recorded.			values were interpolated over the intervals from 20 1/2 to 21 1/2 minutes.	values were interpolated over the interval from 5 3/4 to 16 1/4 minutes.	Temperature values were interpolated over the intervals from 1/2 to 2 1/2 minutes, 11 1/2 to 12 3/4 minutes, and 19 to 20 1/2 minutes.
		Observer missed launch.		Observer missed launch.		Observer missed launch.	Observer missed launch.	Temperature values wer 18 1/2 to 21 1/4 minut wind data recorded.	Observer missed launch.		Temperature values were i and 24 3/4 to 26 minutes.		ture values wer to 12 3/4 minut
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December 3		December 5		December 7		December 9		December 11		December 13		December 15	



## PILOT BALLOON SUMMARY Utah U-a/U-b December, 1977

	Observer mi Observer mi No wind obs Balloon ent " " " " " Observer mi " " " Observer mi	MORN         Observer mi           AFTN         Observer mi           0701         No wind obs           1411         Balloon ent           MORN         "           AFTN         "           MORN         "           AFTN         "           AFTN         "           AFTN         "           MORN         Observer mi           1410         Balloon ent	Observer missed launch.	Observer missed launch.	No wind observations recorded.	Balloon entered clouds after 3 minutes.	Observer missed launch.	= =	=		= =	=	=	=	Observer missed launch.	Balloon entered clouds before any wind observations could be made.	
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Observer missed launch.

AFTN



# AVERAGE MIXING LAYER HEIGHT Utah U-a/U-b Tract December, 1977

DATE	0	+5°	+15*	0	+5*	+15°
1	sfc	1000m	2550m			
3	sfc	3150m	N/D	1150m	3700m	N/D
5				2050m	N/D	N/D
7				600m	1800m	3550m
9						
11	sfc	150m	300m			
13	sfc	100m	1200m	400m	1450m	<b>1</b> 850m
15	400m	1400m	N/D	200m	2950m	N/D
17						
19	200m	N/D	N/D	600m	1600m	3050m
21						
23						
25						
27						
29				300m	1150m	3000m
31						



# CLOUD COVER AND SIGNIFICANT WEATHER Utah U-a/U-b December, 1977

DATE	MORNING	AFTERNOON
1	overcast	
3	overcast	overcast
5		clear
7		scattered
9		
11	clear	
13	clear	clear
15	overcast	overcast
17		
19	scattered	overcast
21		
23		
25		
27		
29		overcast
31		



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DATE 12/03/7	7 . ILME 1313	24SI ASCENI	RATE SUU FPM	LNI ATAU	ERVAL 15 SEC.
II"E HEI	GHI Helimi GL) M (MSL)	U-CUMP M/S	V-CUMP M/S	MND SPEED	UEG DIR
1 9 1 1 5 2 2 5 4 3 9 5 4 5 7 4 5 9 5 5 1 9 5 1 9 5 1 1 2 7 5 13	0. 1676. 76. 1752. 1841. 1917. 1993. 18. 2194. 2311. 39. 2415. 2415. 253. 2755. 253. 2755. 253. 2755. 254. 3120. 31272. 329. 3242. 31272. 339. 344. 3120. 31272. 339. 344.	1.1 2.0 3.0 5.0 5.0 6.7 10.0 11.5 11.5 11.5 11.7 11.7 11.7 11.7 11.7	-1.1 -2.1 -5.2 -7.7 -7.7 -7.7 -7.7 -7.7 -7.7 -7.7 -7	1.5 3.8 7.9 11.3 12.0 10.2 11.7 11.7 11.7 11.7 11.7 11.7 12.0 11.7 11.7 11.7 12.0 13.7 14.0 17.1 18.3 17.1 18.3 17.1 18.3 18.	45. 424. 224. 224. 235. 2



-UTAH-U	444	ELEV 15	76 HETENO -	Stirred first	
771/20/51 STAC	11ME 14844M	ST ASCET	T HATE SOU FPE	UATA 11-1	ERVAL 15 SFL.
TIME HEIGHT	HEIGHT	DEG C	STD - 300M	LAPSE	MAS DEG
5FC 5 A 7 150 1 5 7 350 324 2 5 500 6 4 824 7 4 1324 12 0 2324	2000.	5.79 4.64 5.74 4.64	2 23		19.5 264 20.1 264 19.3 264 19.3 261 18.4 253
		· · · · · · · · · · · · · · · · · · ·			
. LIAH L			TO METERS		
DATE 12/05/77	11ME 14:04	IST ASCEN	T RATE SOU FP"	DATA INI	ERVAL 15 SEL
TIME HEIGHT		U=COMP.	-V+CUMP	WND SPEED	WND DIR UEG
3.0 9.5 7.6 1.5 3.10 2.5 5.08 5.08 5.08 5.08 5.08 5.08 5.08 5.09 5.08 5.09	175 175 175 175 175 175 175 175 175 175	13.8 da 99 13.8 da 99 18.4 97 11.5 b8 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3	1 3 8 1 9 1 1 9 7 1 1 1 7 9 1 1 1 1 7 9 1 1 1 1	7 6 5 6 5 6 5 6 5 6 5 6 5 6 5 6 5 6 5 6



and the second s	- UTAH-UA	NJH	—————————————————————————————————————	76 METERS	- SUUNDIN	<u> </u>
DATE 12	167/77	Tine 1481	1 ST ASCES	I KAIR SOU FR	CATA IN	TERVAL 15 sec.
	- MEJGHI -M (AGL)	HE1(-H1 M (MSL)		STD 3000		
1.8	\$ 500 \$ 300 \$ 300 \$ 773 \$ 774 \$ 1524 \$ 2524 \$ 3324	2000 1975 2176 2249 2500 3000 4600 5000	10 25 10 40 7 85 8 58 8 58 8 58 8 58 8 58 8 58 8 58	-1.55 -1.44 -2.05 -5.45 -0.06 -5.45 -1.92 -1.63 -1.37 -7.21 -1.47 -7.21 -4.10 -1.87 -5.86 -5.16 10.12 -1.96 -1.40 -1.37	1 1 0 3 29 -0 20	2.6 25% 12.6 25% 13.2 227
DATE 12	UTAH UA			TO METERS.		3 10 5752 TERVAL 15 SEC.
TIME	HEIGHT M (AGL)	HEIGHT M (MSL)	U=CAMP	V=CNMP	WND SPEED	WND DIR DEG
0 0 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5	7639 7539 12559 2559 2559 2559 2559 2559 2559 25	1075295 17529 175	1.5 4.7 7.1 6.8 9.8 11.25 7.5 7.6 7.6 8.6 12.1 11.0 11	1 . 8 2 . 7 3 . 7 5 . 7 7 . 1 5 . 4 5 . 4 5 . 4 5 . 4 7 . 7 8 . 8 9 . 2 9 . 2 8 . 8 10	2.0 5.3 7.8 113.3 9.3 9.3 12.3 13.3	242 243 243 243 243 243 243 253 253 253 253 253 253 253 253 253 25



		å (+ <u>+</u> \$	the +	070 AF IEA	15.	S	v6 13 571	53
DATE 12	2/11/77	· II'E ubioi	* 11 ASC	INT HATE S	W. FP	UATA_I	STERVAL IS	3 366.
11146	1 (Abl.)	- MEIGHT.	128 G G	S10	300M	LAPSE.		- Ot 0
1.4 2.1 2.1 3.3 7.7 14.5 2.6 6.6	324. * 457	3090	11 12 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	-1.95 -1.30 -1.53 -9.10	5.52- 4.71 5.52- 4.71 5.52- 7.72- 7-	8.25 7.63 3.29 -1.51 1.64 2.20 -4.11 -4.35 U.55	- 1 - 6 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	Q
DATE 12	/11/77	11MF 081017		olu vetek ul Rate 5			ile 10 575 ifficial 15	
TIME	relant h (AGE)	melight m (M3)	11-C1-12	v • GU · I		1. 12 SFEE.	JF6	
	/1	1676.	•1.0	- () .	1		90.	



fact attab	n UAHB.	+1,+ V-40	70 -1,15 m	5	5 ) <u>[</u> 5.	6 1.: 575	1
DATE 12/13/77	7 7116 07:3	IMST ASCENT	RAIF. 5	1., 1.1.	L'ATA IN	TERVAL 15	SEC.
TIME HEIG	SHT HAISHT	DEG L	91:	3000	1.4P5t	4S	ωξ, ,
SF 150 15	1828		4.01	_0.57	3.54	3,4	317.
2 1 3 5 6 8 2 5 6 8 2 8 2 8 2 8 2 8 2 8 2 8 2 8 2 8 2 8	24. 26.10		3.3	=0.70 =0.57 =0.95		2.7	254.
8.5 132	2501. 15 - 2901 - 3000.	-5 75	~	1 92	4.84	11.7	202.
15.4 232	2 3226 2 3418 4 4636 4 5003	5.75	5.32	38	2.54		
27.5 432	an on on	=24.65	7:09	-4.01	-1,68		
Maria de la constitución de la c				The same of the sa		the state of the s	
DATE 12/13/77	TIME #7:31	MST ASCENT			DATA IN		
TI'E FEIG	HEIGHI	H=Clark	V-C IN	·	N'O SPEED	NJ OK.	
5 . d. 7 7 . 5	7. 1752.	1.5		4	2.5	315.	
	7. 1933.	2.5	1.3	<u>.</u>	5 - 7	242.	
46 46 40 61	2212.	3.5	1.5		3 · 7 · 5 · 7 · 7 · 7 · 7	251.	
3. U /6'	5 2441	5.3	2.7		5.1	237.	
7.0 109 7.0 109 7.0 117 7.0 117 8.0 117 8.0 147	5 2771 1 2027 1 2027	7 7 1	3		11.4	250.	,
8.5 9.0 140 140 140	4. 3076. 6. 3152.	1 1 0 7 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0		,	11.7	202.	
5.5 24 29 1 29 1 29 1 29 1 29 1 29 1 29 1 2	2517 2013 5 2013 5 2771 1 2421 3 172 3 172 3 172 3 175 3	5.3 7.1 1.0 1.1 1.0 1.1 1.0 1.0 1.0 1.0 1.0 1	0.3		9 2 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	237	
15.4 105	7. 55.55.	1 · <u>1</u>	m !		10.4	215.	



	**							
UTAH UAUB			ELEV	670 METE	-3-	-Similar in 5774		
TE 12	/13/77	TIME 14:100	ASCE	NI HATE S	BY4 DU	- DATA IN	TERVAL 1	St.C.
TIME	M (AGL)	HEIGHT	DEG C		1)/T	LAPSE	#5 - M/S .	JEG
1.7	SFC 150 300	182	6:47	-1.95	4.46	-1.15	1.5	135
1 A	324.	2170	6.47 5.40 5.11	-0.27	-1.49-	1.07	· () Q	125
5.1	1324.	2500. 3000.	-1.26 -1.76 -1.76	-3.55	-1,48 -2,20 -3,8	1.05 0.65 3.31	5.2	- 255
74.4	2324.	4000	-10 07 -18 85	-5.45		1.59		
2112	32.4				50 00 h	A STANDARD	P VPD Stripper Primary	
	Speciment property and the state of the stat	The second secon	The second of th	April S. d. C. Control of Spirite American Services	STATE STATE ASSESSED ASSESSEDA	tellallon almine of menons of	Contraction of the Contraction o	
	UTAH UZ			676 METER	- e us		G 10 57	
ITE 12	/13/77	TIME 10110h	ST ASCE	NT RATE S	OUD FPM	DATA IN	TERVAL 1	SEC,
TIME	MEIGHT M. (AGL)	HEIGHT (MSL)	U-COMP	V-CUM	19	MND SPEED	L DEG	₹
0.0.	76.	1752	-1.1	-1	9,	1 5	135.	. n
1.5	275	1858. 1951. 2028.	0.3	= ()	5	1-1	324. 19.	
3.0	1 500.	2103	=1.3	2	7		14.7	
4.5	550.	2332.	0 5 0 0	6.6	1 -	2.2	167.	
5.6	009.	2485.	2.0	3	<u> </u>	5.5	198.	
5.5	961. 1637. 1110.	2537. 2713. 2790.	5.5	5	3	7 0 0	220.	de um transp
7.5	1276	2952	7.6	3	5	8.6	23/	
9.0	1429	3155:	12.1	-1	8	12.3	276.	
57.505 05 05 05 05 05 05 05 05 05 05 05 05	1637. 1114. 1197. 1362. 1362. 1587. 1587. 1733. 1816.	2719 0 2719 0 27	5.5 5.5 9.5 12.1 13.6 9.9 8.6 5.8	0	p2	7 0 4 4 0 5 8 6 9 6 1 2 3 1 3 5 1 1 0 9 9 8 6 7 5 7 1	231. 231. 245. 276. 276. 276. 274. 274. 296.	
11.5	1610	3486	5 8	= 0 = 2 = 3.	7 5	7.5	541.	



	LITAN ().	41.	F1. E. v 1.0	70 ALTERS .	3 4	5709
DATE -12	/15/77	11ME 07:36	MST ASCEN	T HATE SOO FPM	DATA I.	TERVAL 15 SEL.
IIME.	- METGHT	M (MSL)	DEG C	- STD 300M	LAPSE-	
1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	324 324 3324 3324 3324	1828- 1970 2000 2176 2534 73000 4000 4000 5000	5.87 5.39 4.45 1.98 1.36 8.36 8.34		0.71 1.78 0.88 0.88 0.02 0.02 0.02	.,
DATE 12	UTAH_UA	TI E U783.		76 METERS		5 10 5709 SEC.
LIME		HEILHI _	J=Canp	V=C::::P	AND SPEEU	
	761 761 761 761 761 761 761 761	17537 59 6 28 4 21 5 29 5 1 1 2 2 3 3 3 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	1.5 3.55 4.01 4.01 4.01 4.01 4.01 4.01 4.01 4.01	1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1.5.3 1.4.5.3 1.4.5.3 1.4.5.3 1.4.5.3 1.4.5.3 1.	196. 197. 197. 197. 199. 199. 199. 211. 229. 221. 221. 221



	ELEV 1070 METERS-			Similanta( 10) 5708			
DATE 12/15/77	11"E 14\$11"a1	ASCE	T.HATE	SUL FF.	UATA	LATERVAL 15	3E6.
TIME MEIG	I MEIGHT	TEMP.	_D/1 - \$10	- 300H	LAPSE-		UEu
31 32 4 332	1826 1976 1. 72000.	6.63	-1 . 49 -1 . 21 -0 . 19 -1 . 67 -1 . 64 -4 . 30 -8 . 99 -5 . 97	-2.27 -2.80 -3.80	0.72 0.71 0.71 0.35 0.87 0.87	2.0 -5.6 -7.2 7.4 -7.4 -13.4 -15.0	45. 142. 142. 144. 211.
DATE 12/15/77	UAUR 14:11MRT	FCLEP.	T RATE	SOO EPM	DATA - LD_SPE	ING ID 576	
0.0 0.5 1.0 1.5 2.5 2.5 2.5 3.0 3.5 3.5 4.0 6.5 5.0 7.0 6.5 9.1 6.5 9.1 9.1 9.1 9.1 9.1 9.1 9.1 9.1	1076 1752 1875 1898 1998 1998 1998 1998 1998 1998 199	8 -1 - 25 - 59 - 5 - 5 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	5	7.5 7.0 7.0 7.0 8.7 11.0	45. 181. 191. 192. 172. 187. 185. 185. 185. 187. 185. 187. 185. 187. 195. 195. 215. 221.	



	WIAH WA	l l j i j	ELEV 1	070 11 1 1 E	ું છે 🔙 💮	Subvote6 10 5704		
USI STAU	19/77	TIPE 07:01	TOT ASCE	OT HATE	Suc FP.	DATA 14	TERVAL 1:	sec.
		HEIGHT -	DEG C	STD -	0/T			11/2/10
1 . 5	* 154 * 154 * 154 * 364 * 500 R24	1825 1879 1976 1945 -2444 2175	=4.58	1.44 1.44 -0.17 -0.77 -3.03 -4.97		4 . 47 4 . 47 4 . 47 5 . 42 5 . 42 5 . 42 5 . 5 . 5 . 5 . 5 . 5 . 5 . 5 . 5 .	55 55	515.
12,6	1324; 	-3000 4000 	ELEV 16	9,71.		2.18 2.27 3LU.DI.		
IIME.	HEIGHT MAGE)	mFIGHT.	U=ClimP	V#ÇL	/S	MYS ED	MND_UIX	?
		1676	1.1	- 1	. 1		315.	
The second secon					25 mm 1 mm Sunr		gr Carlo a suppr	



				TO WETER	S of in inside	S. H. (a) 1 - (a) 1 - 5/105		
DATE 12	/19/77	1176, 14:11	1 . ST ASCE	T RATE 5	NU FH:	DATA 11.	CI JAVNAT	SEC.
		M (MSL)	DEG C	-D/T			- 48. - M/3	ut G
7.7	56 C 150 324 500 -500 -824 *1401 *1705 -2324 3324	2000. 1976. 2176. 3000. 3077.	=1.70 =1.45 =3.45 =7.90 =8.50 =1.12	=1.63 =0.31 =0.19 =1.84 =1.84	-4.73 -1.35 -1.34 -3.19 -0.58 -1.34 -1.34 -1.34 -1.34 -1.35 -1.34 -1.36 -1.37 -1	1.80 1.00 1.00 -1.59 -0.17 2.35 -2.93 -0.58 1.14	5	18 321, 307, 317, 254,
	AND A STATE OF THE						And the second s	
	illan u	1UB	FLEV-10	7n .nt Tex	\$	Shingle	5 Iv. 576	3
DATE 12	/19/77	TIME 1411	MST ASCEN	T RATE 5	OU FPM.	DATA IN	TERVAL 15	SEC.
- TINE	HELGHI.	HEIGH!	U-COMP M/S	Y-CUM M/S		MND SPEED	AND DIR	
0.0	76. 191. 299. 400.	1676. 1752. 1807. 1975. 2075. 2152. 2259.	9.7 2.5 3.2 1.5	- 2.	7 7 7 5 1	1.5	180 337 316 319 303 271 217	



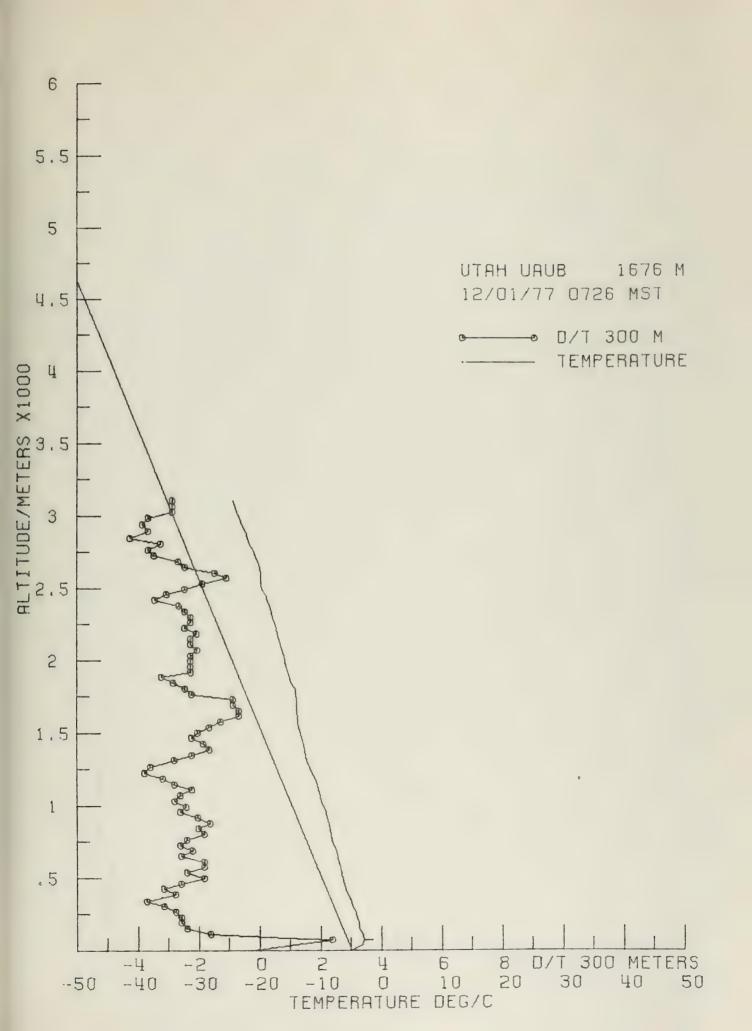
LIIAH LIALK		tity 1076 (tites			Samuel 10 5702		
ATE 12/29/77	1106 1411	inst abbei	+T KATE	Sun FP	DATA I.	JERVAL 15	SFC.
TIME MEIGHT	hildel (NSL)	DEG C		300M .	LAPSE	*S	UEG
5 F C 1 5 U 2 3 U 3 2 U 4 1 2 3 2 U 4 2 3 2 U 4 2 3 2 U 4 3 U 4	1826 1976 2020 2176 2520 -3000 -4003 5000 6000	5.58 1.68 2.24 5.16 5.22 2.51 1.79 -1.50 -	*3.90 0.50 0.92 *0.42 *1.05 =7.65 =9.11	=1.94	3.65 3.49 7.25 5.49 6.49 2.93 1.99 1.22 0.99		.:
LITAH UA	A LIES	ELEV 10	70 BETE	RS	Sug.vol	nG ID 576	2

TIME REIGHT HEIGHT WHOMP VHOUR SEEEN WAND DIN

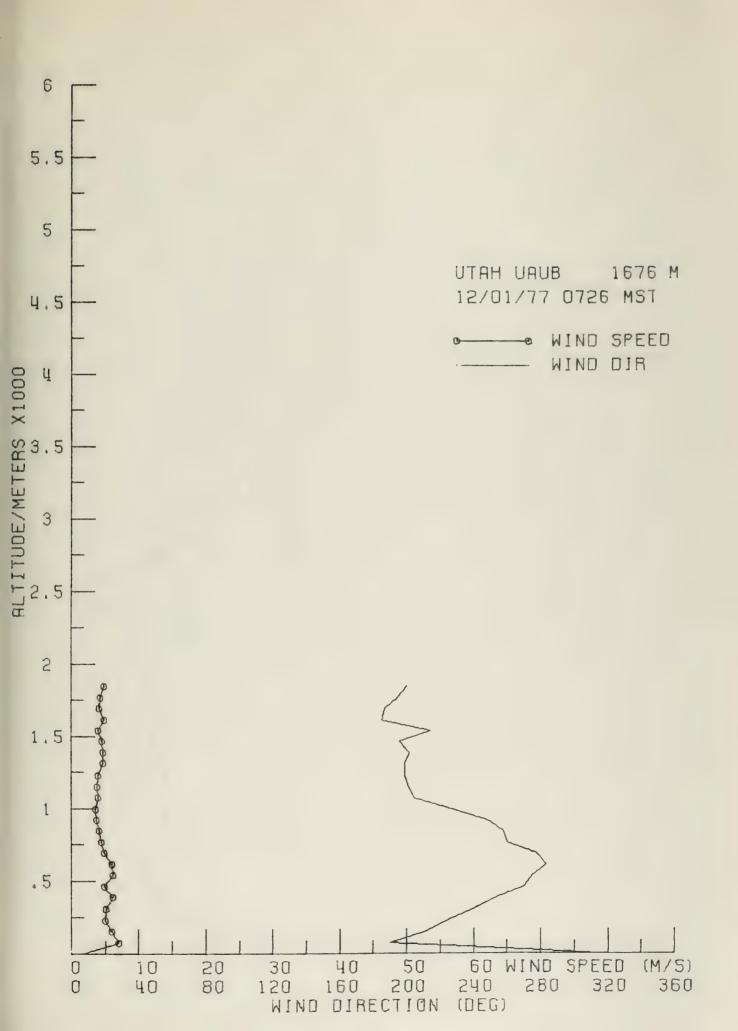
DATE 12/29/17 TIME 14110 M. POCEM MATE SUC FEE MATA INTERVAL 15 DEC.

THE WIND DATA ARE HISSING

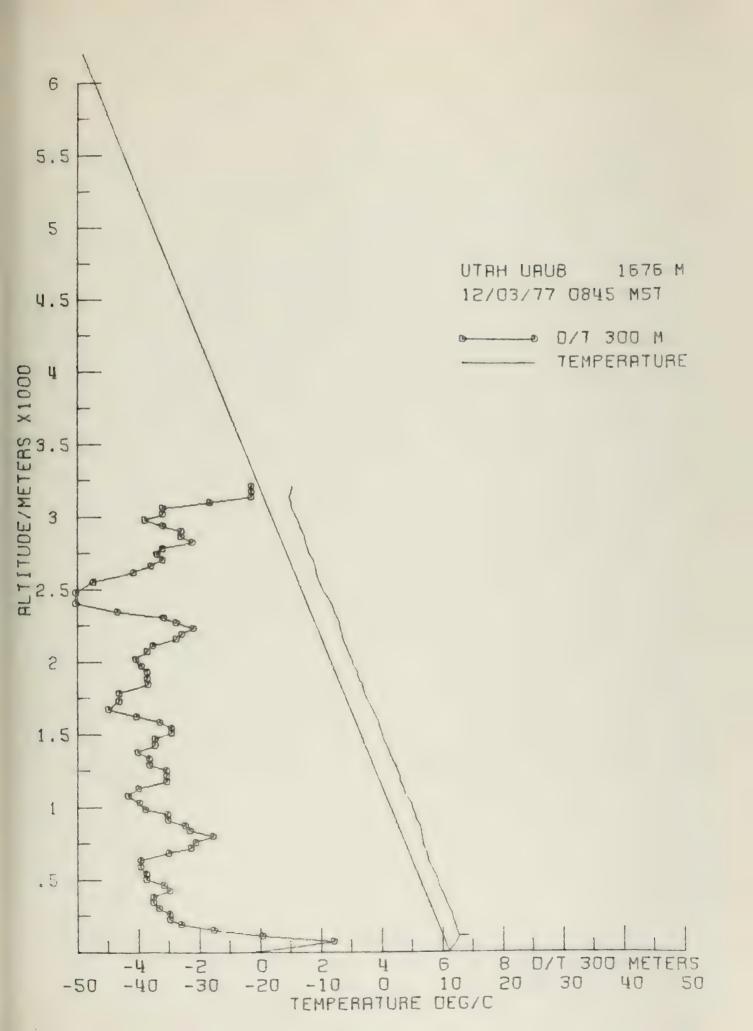




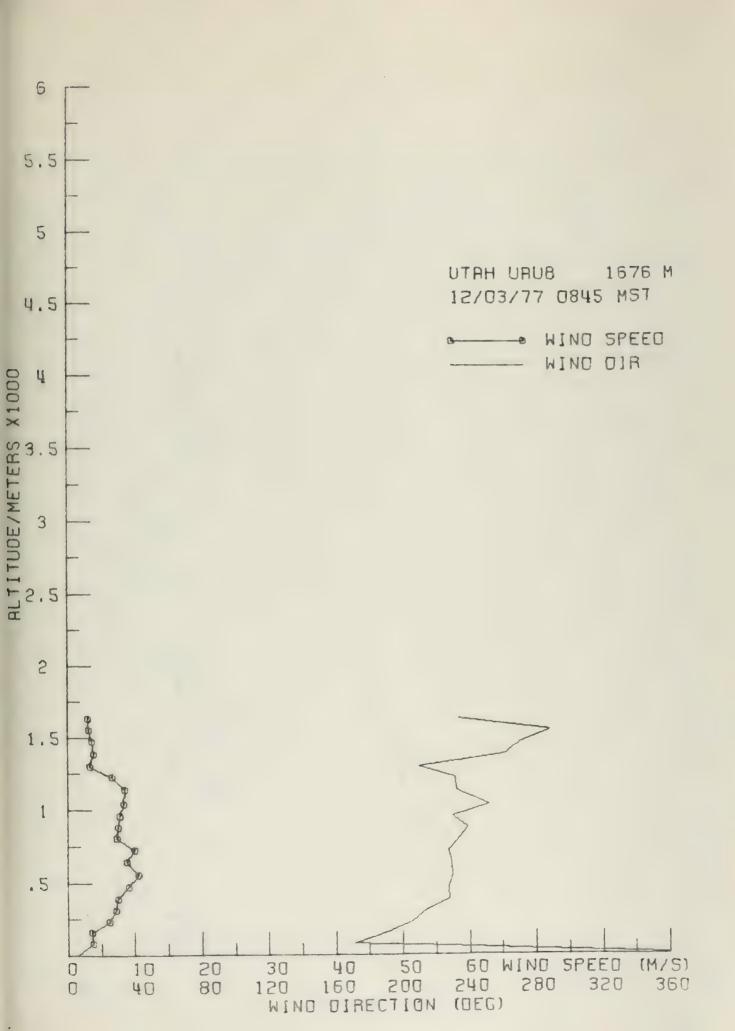




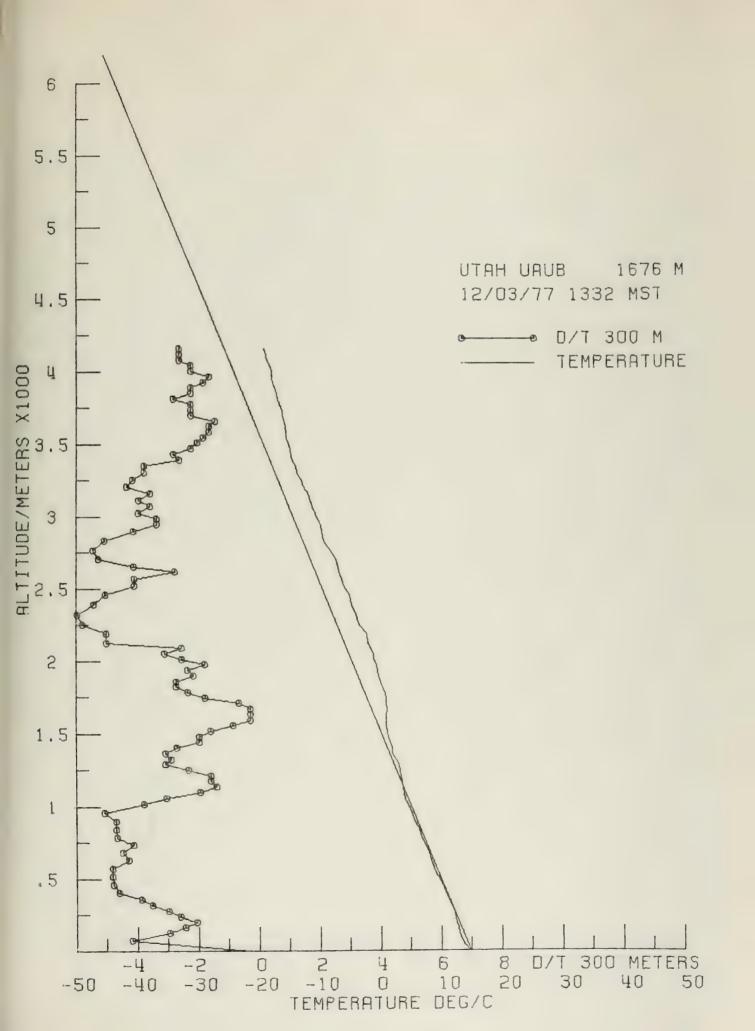




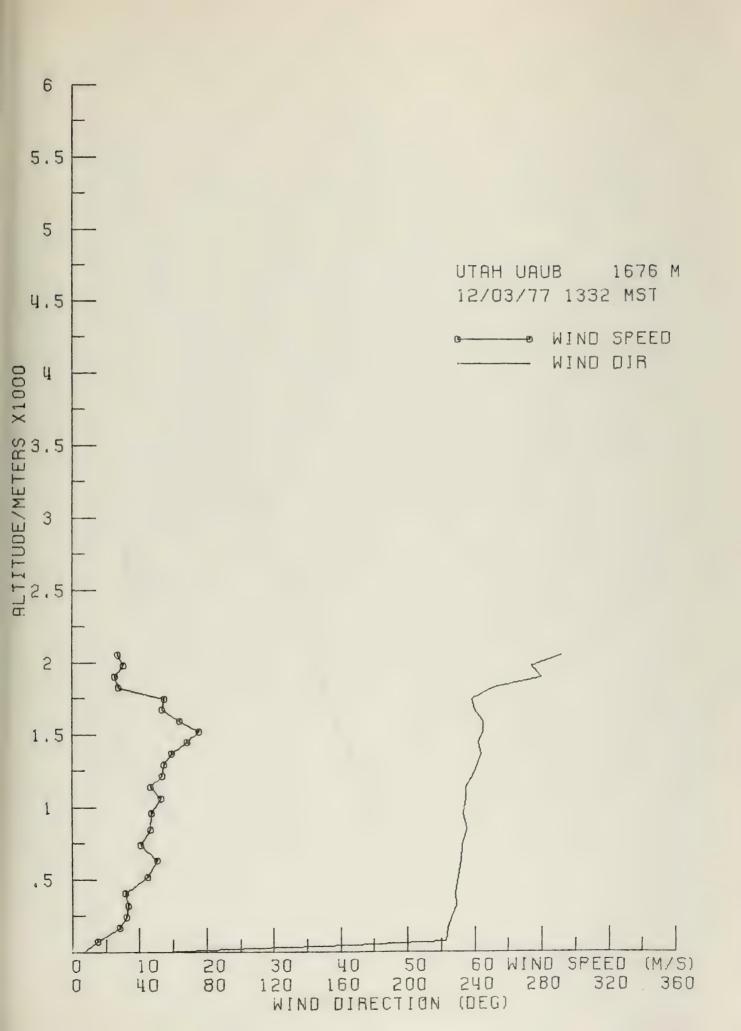




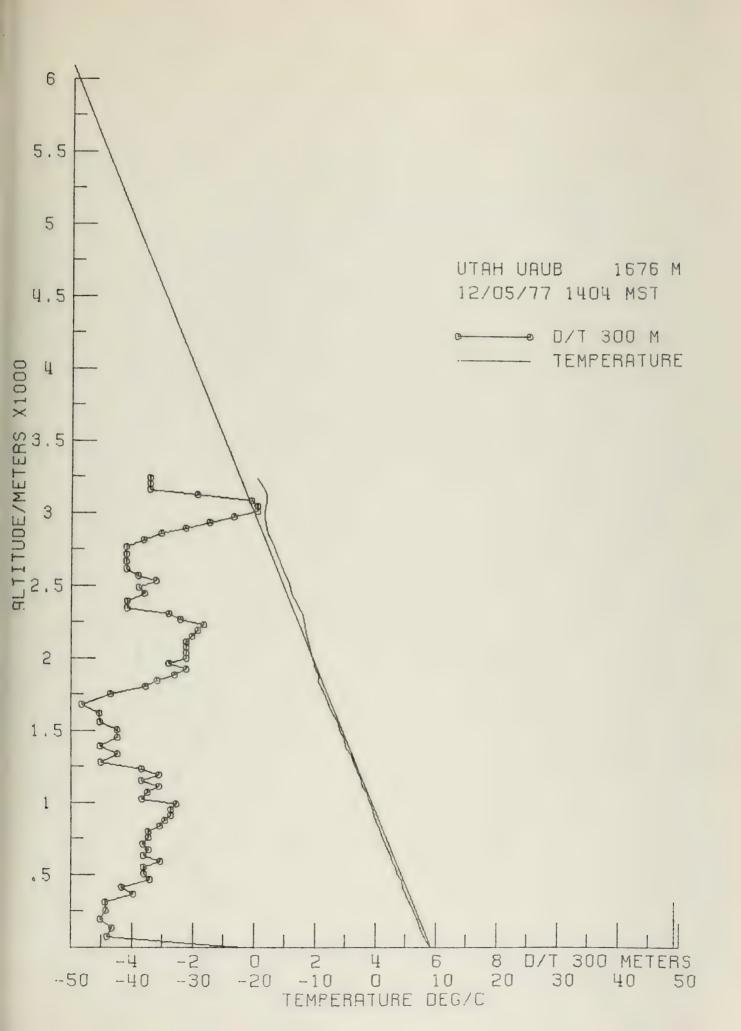




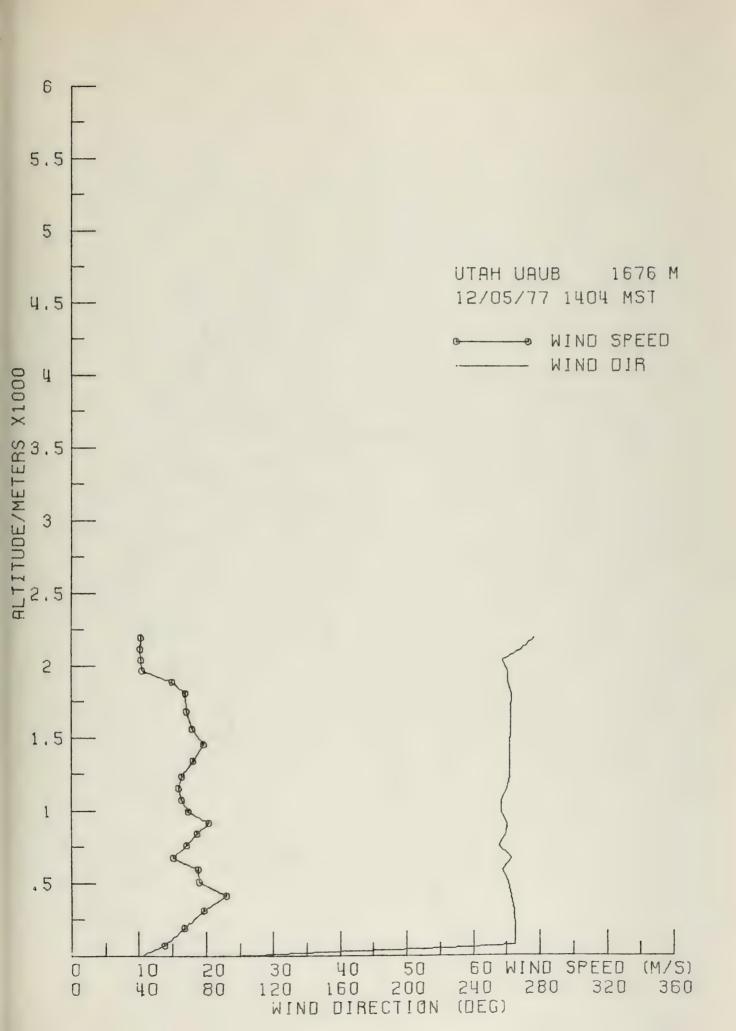




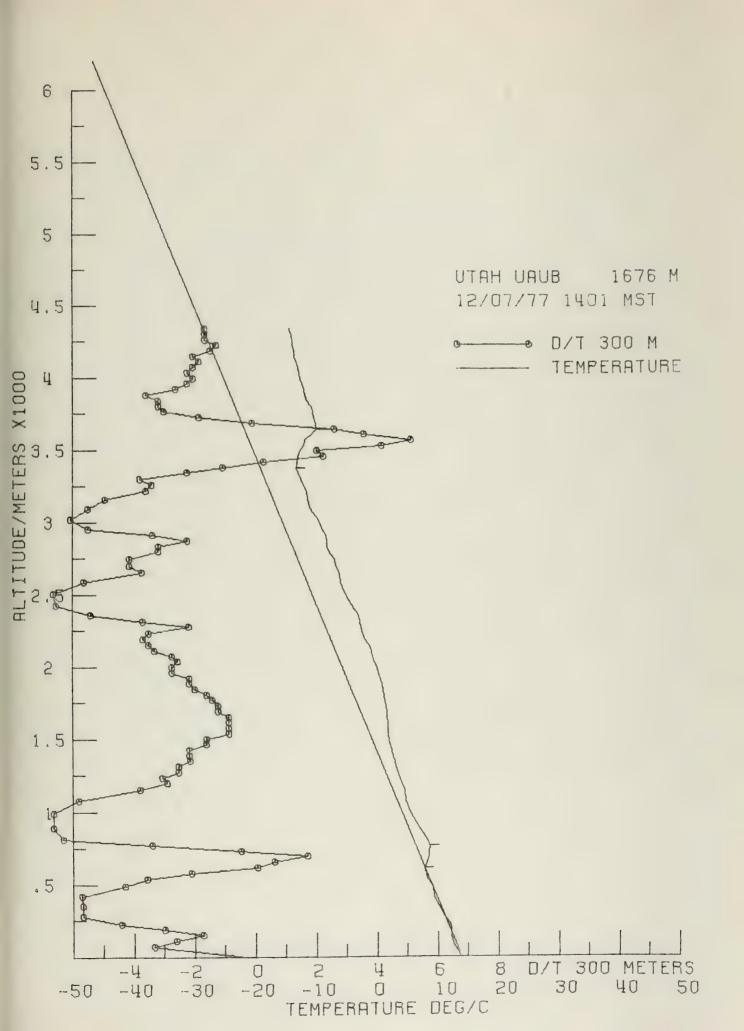




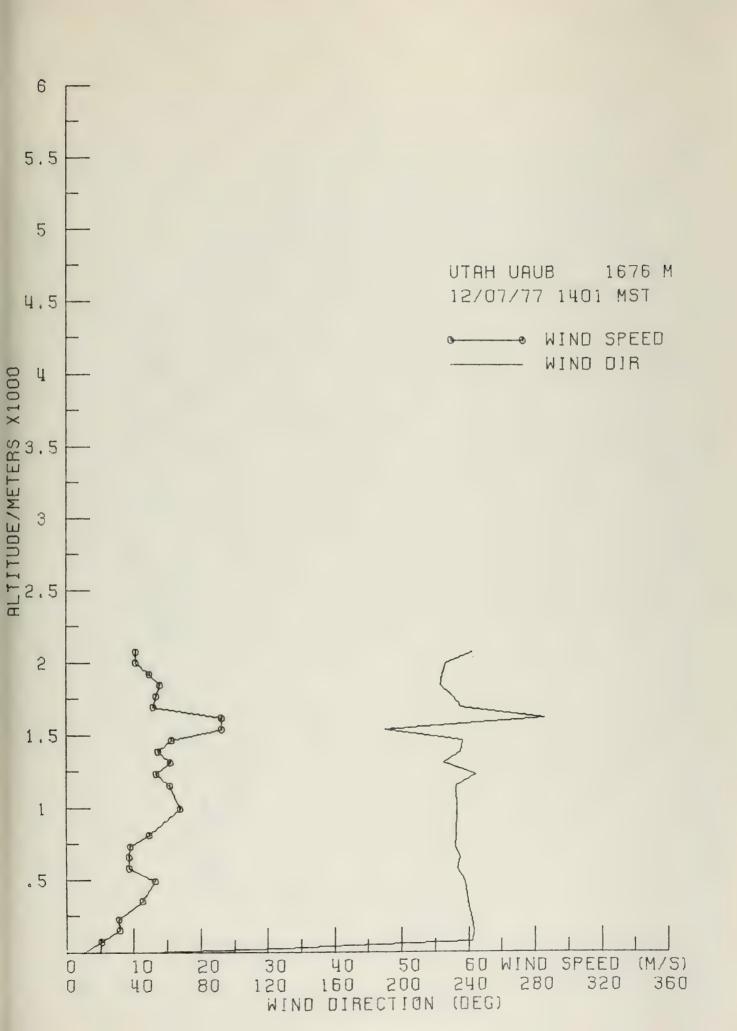




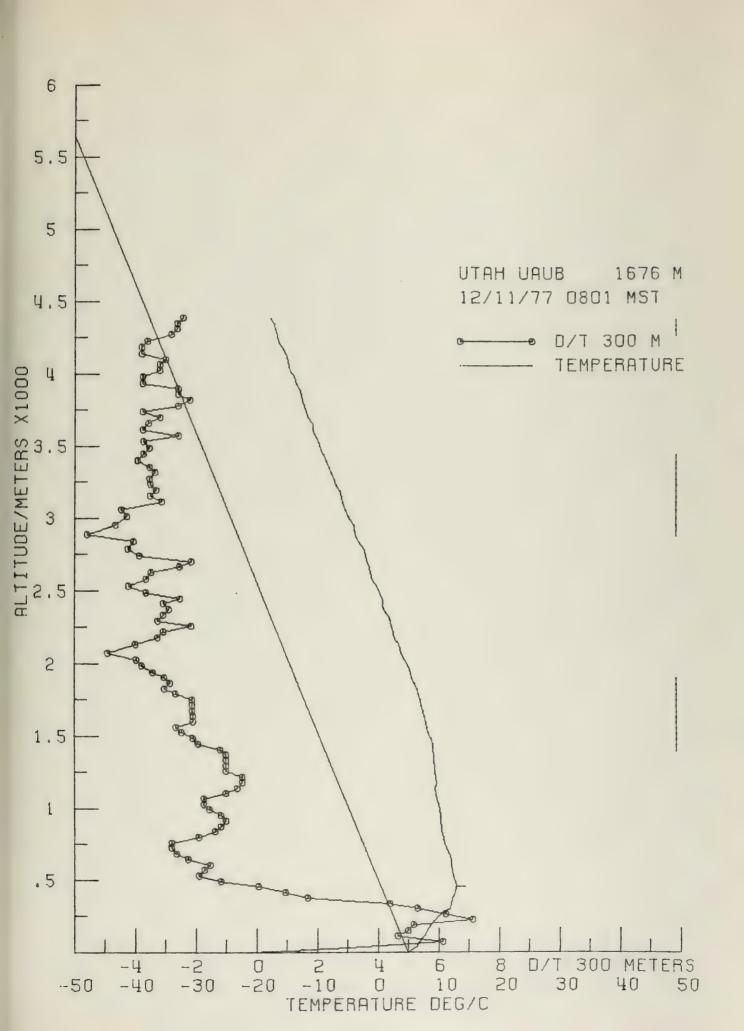




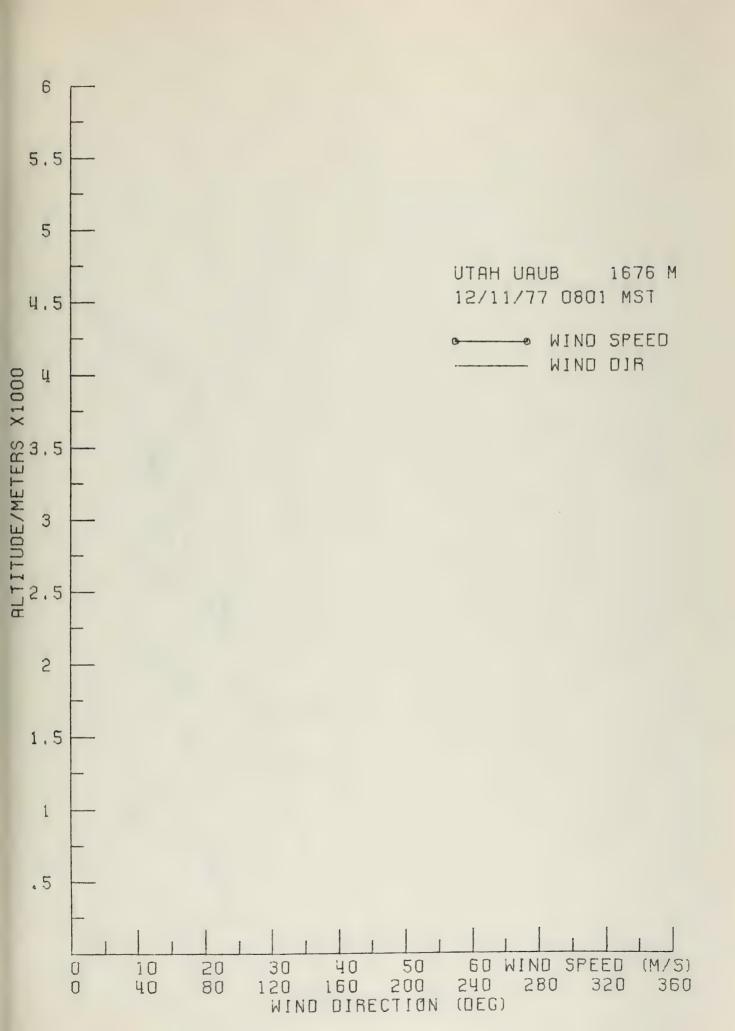




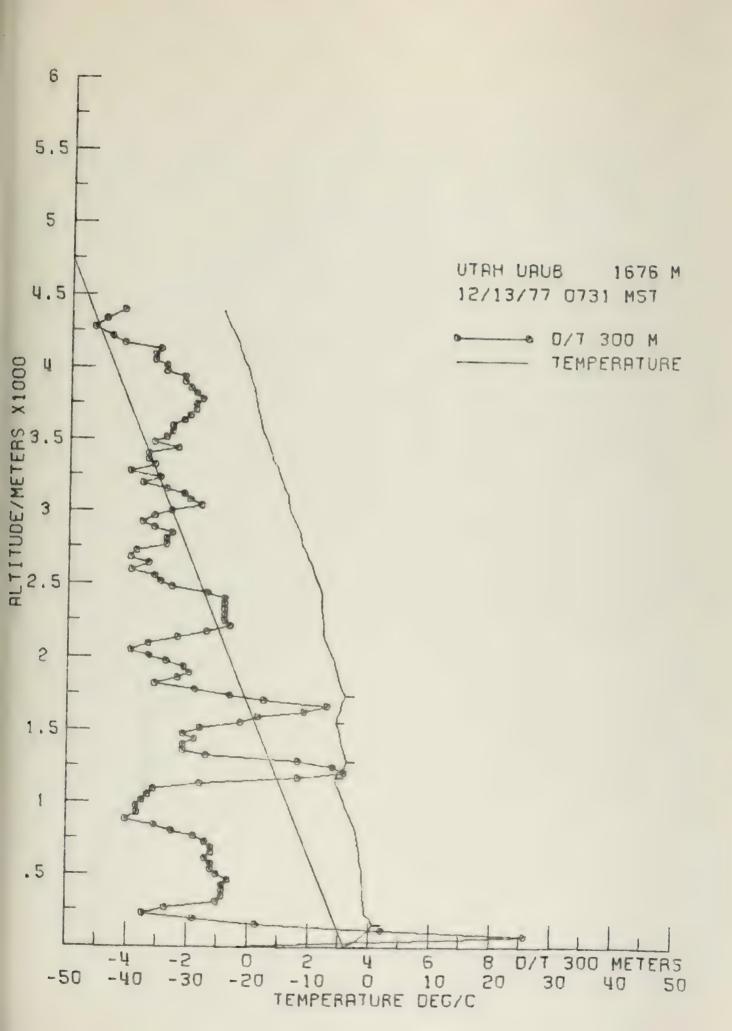




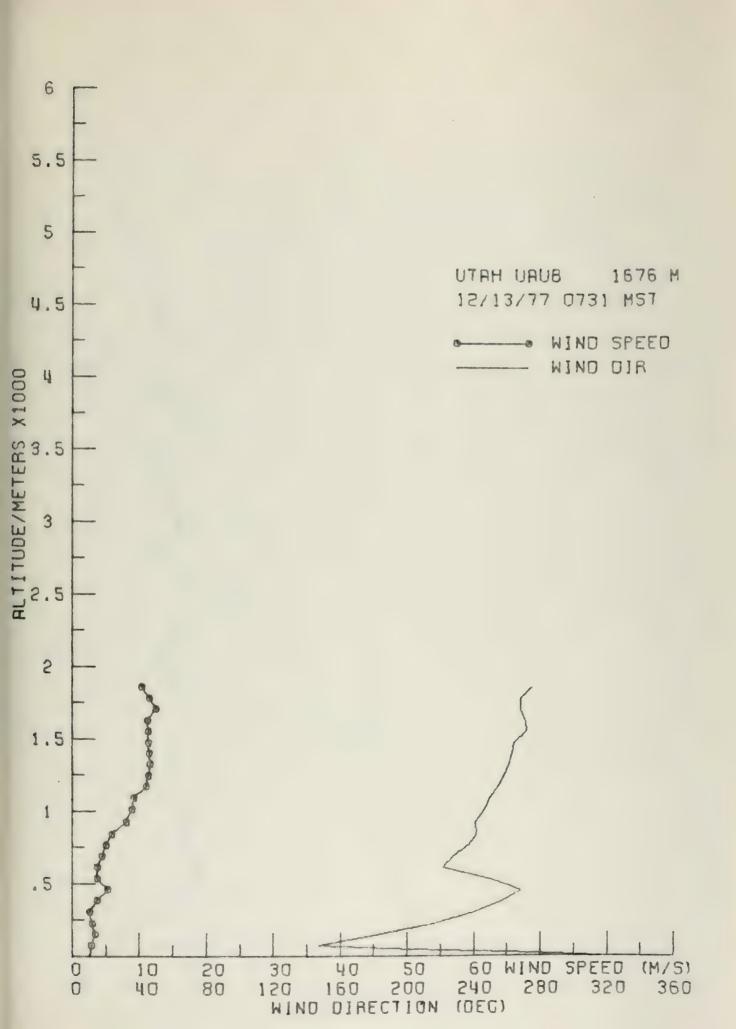




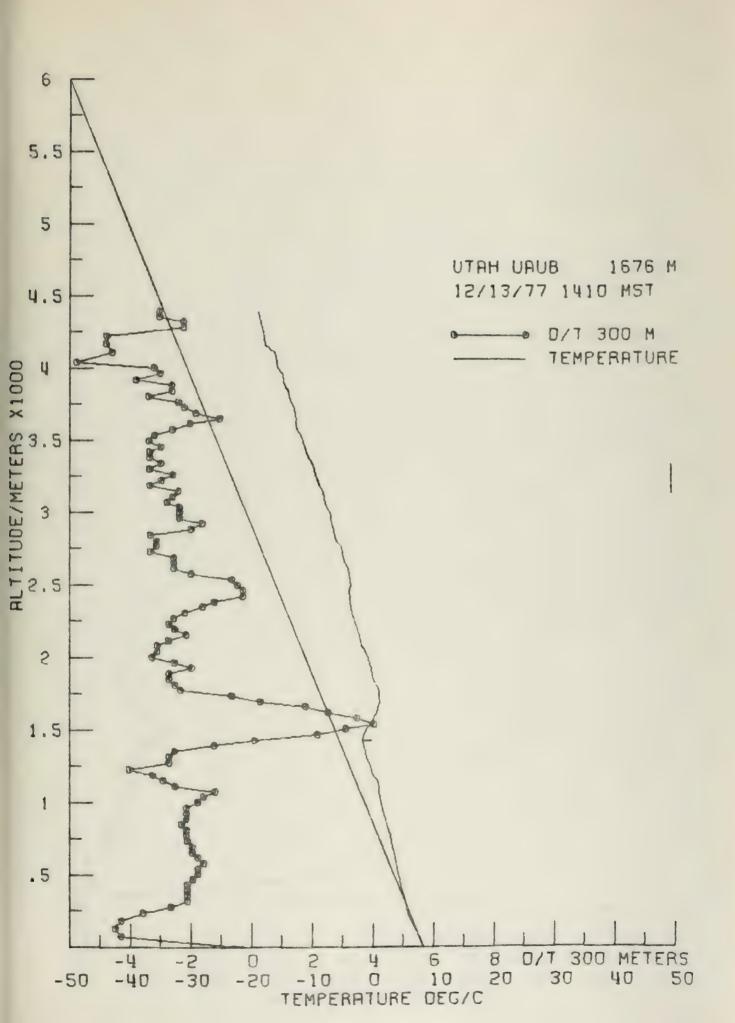




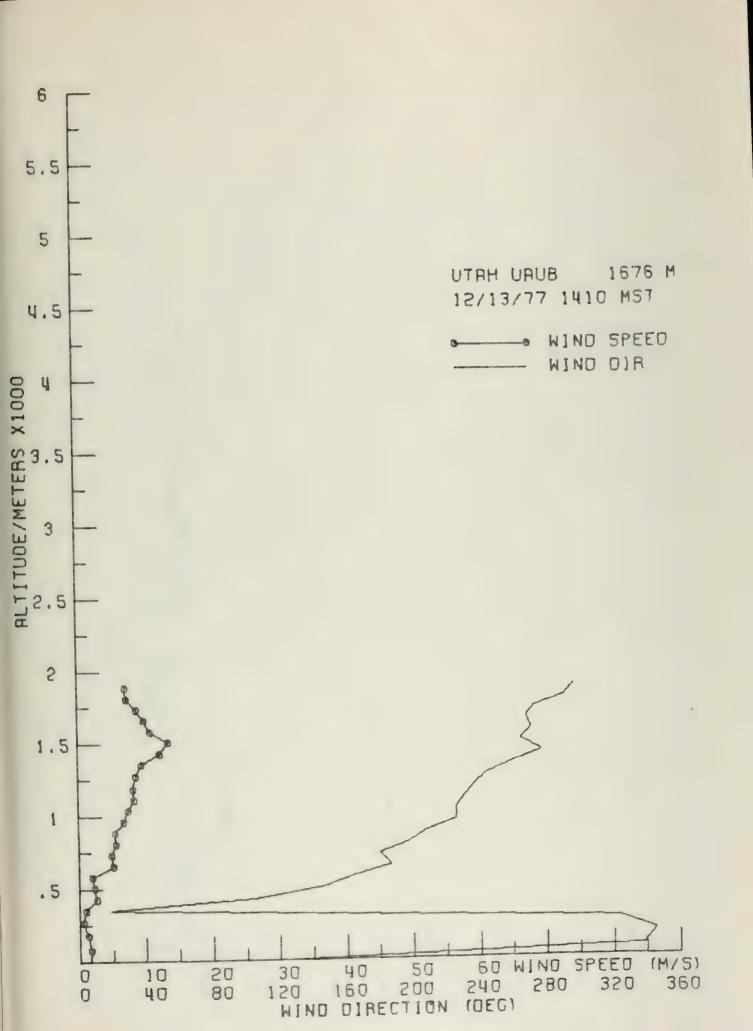




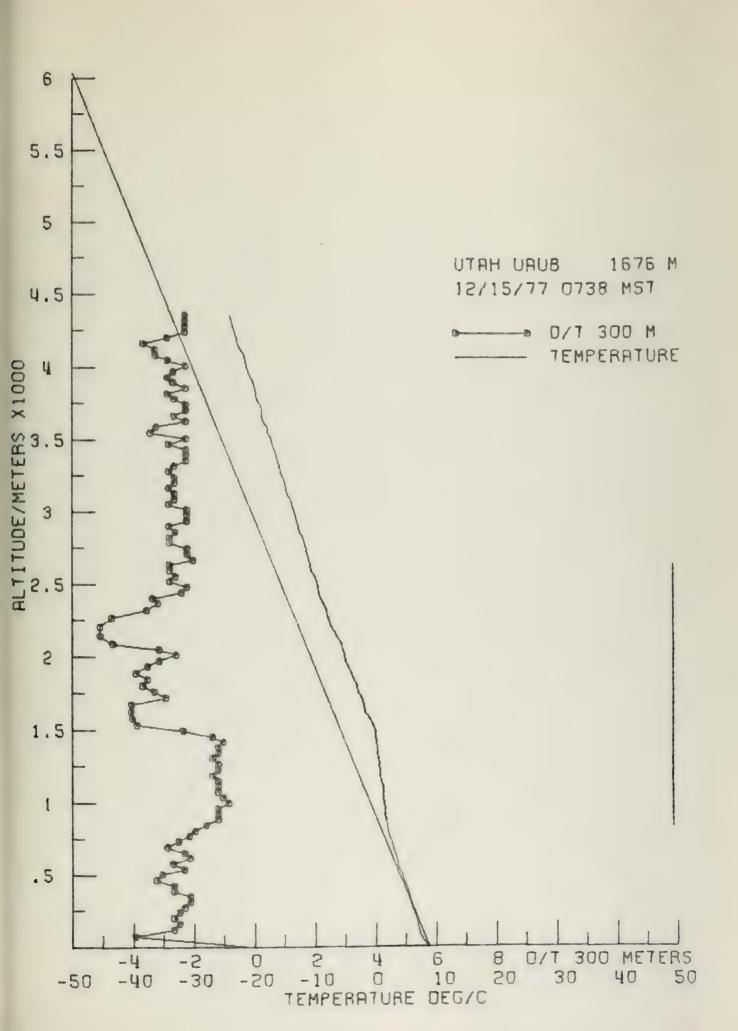




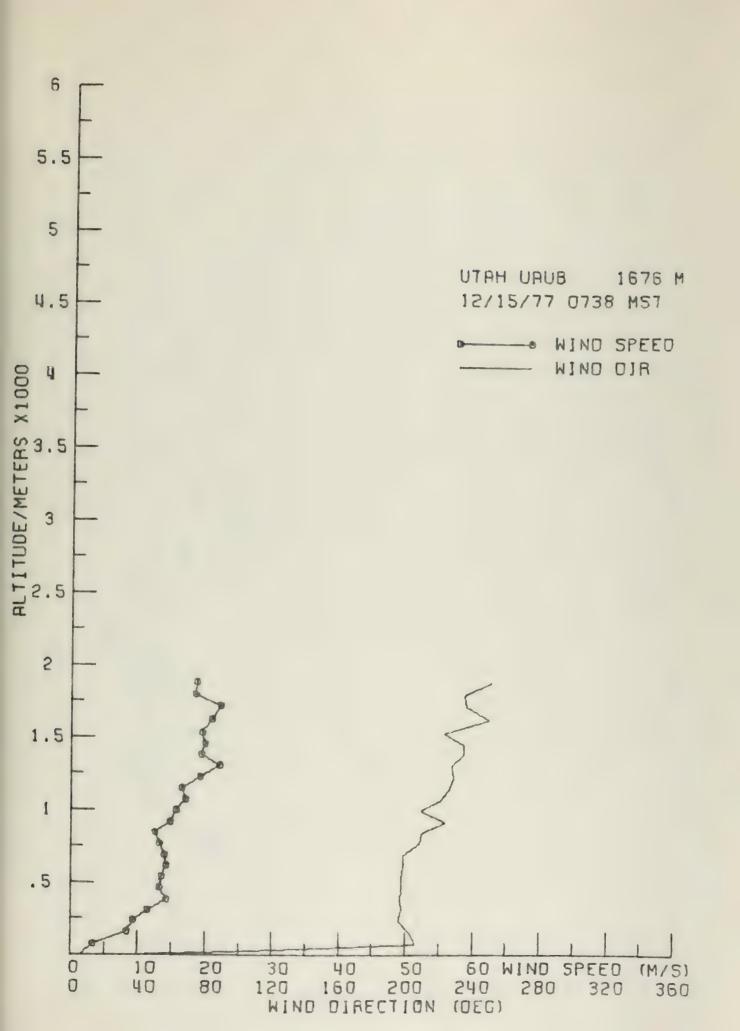




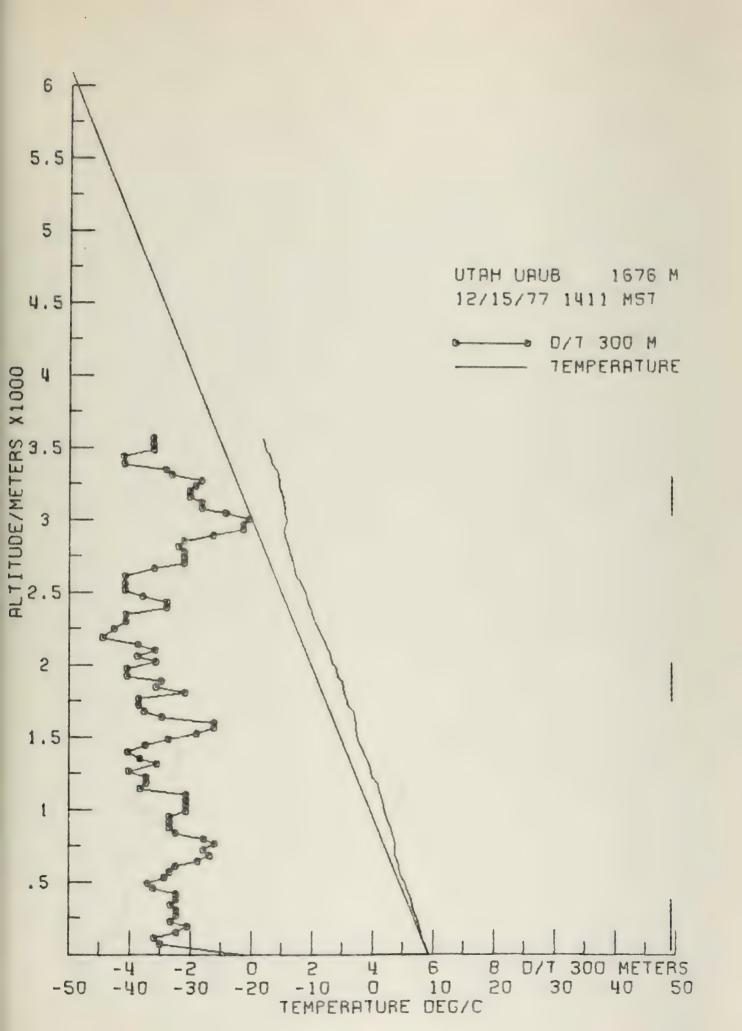




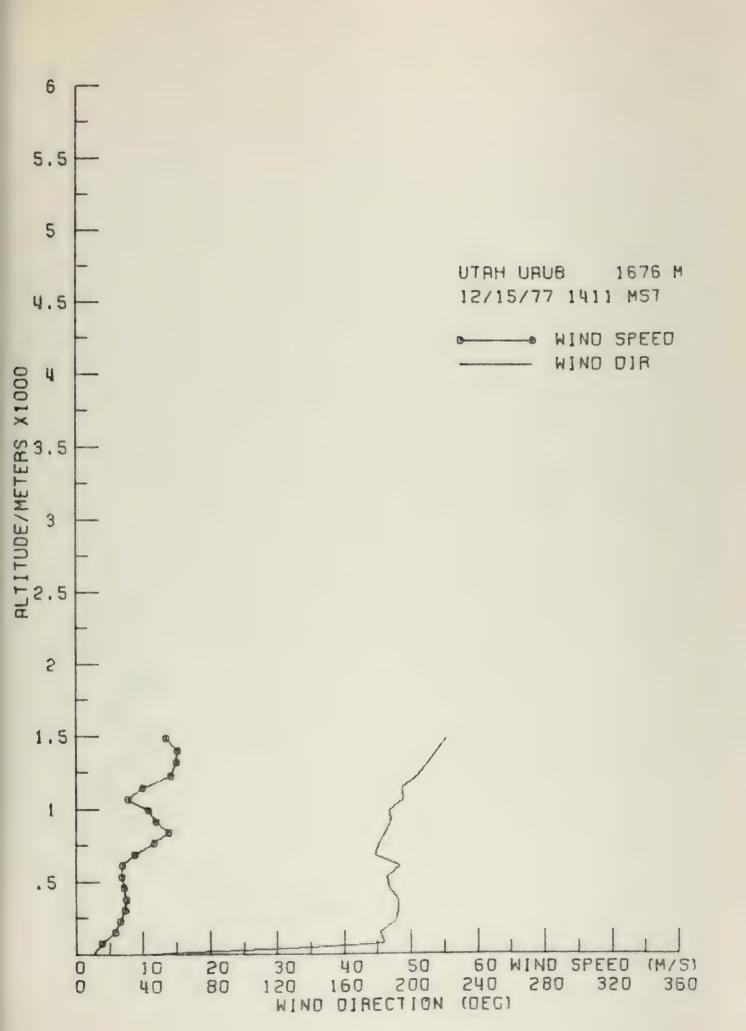




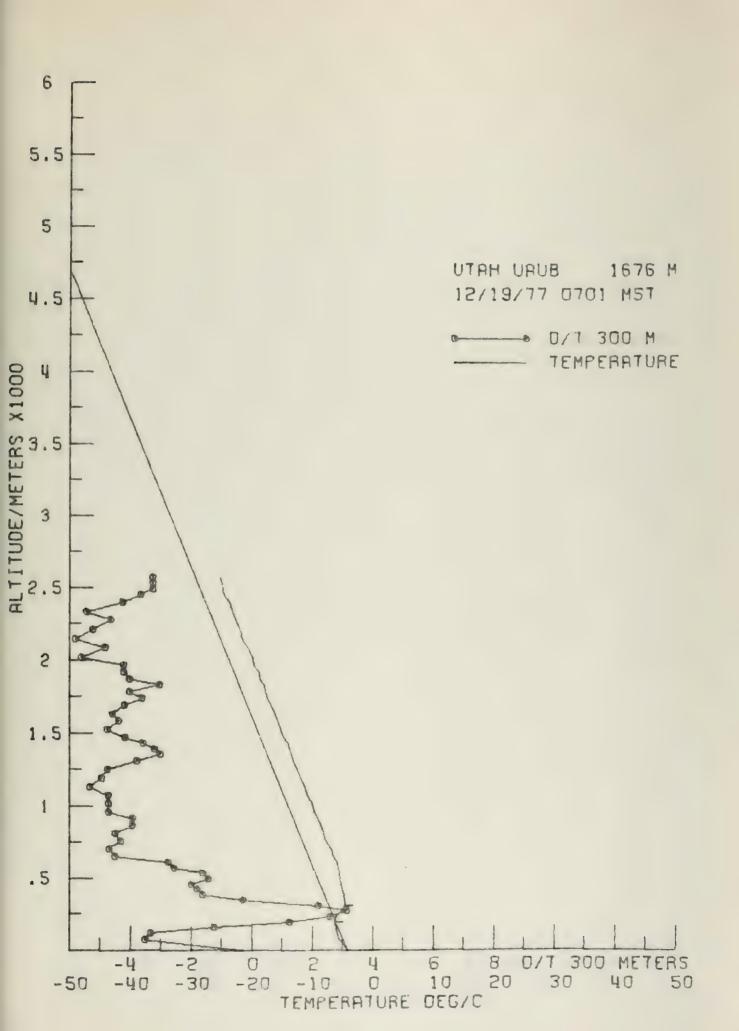


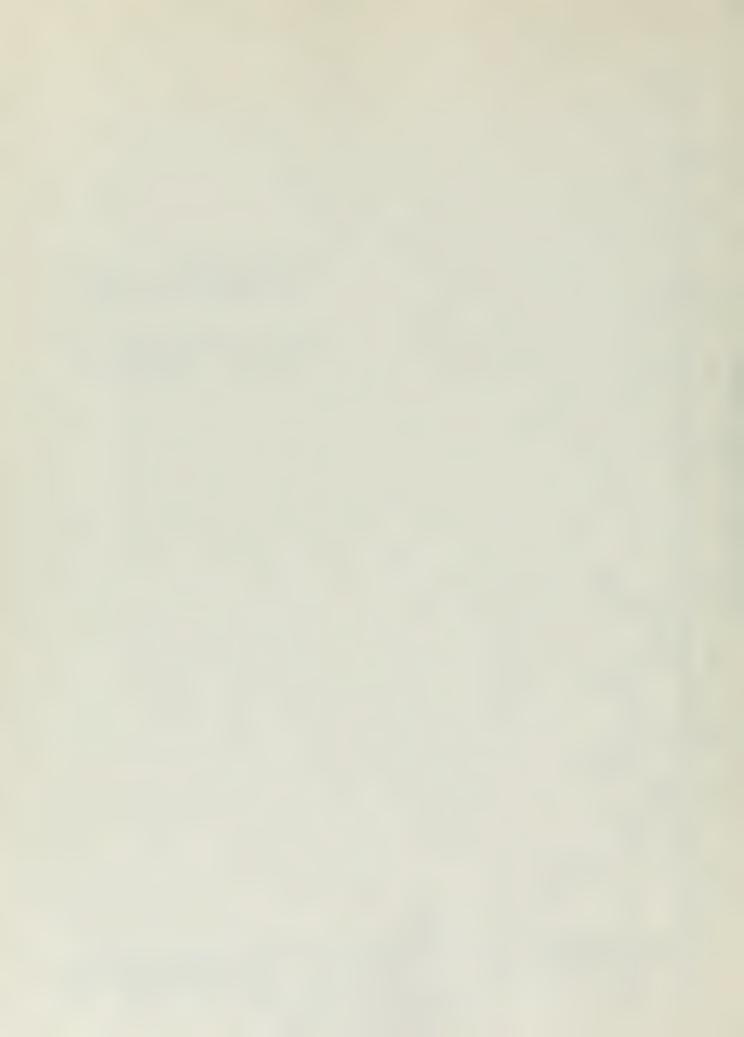


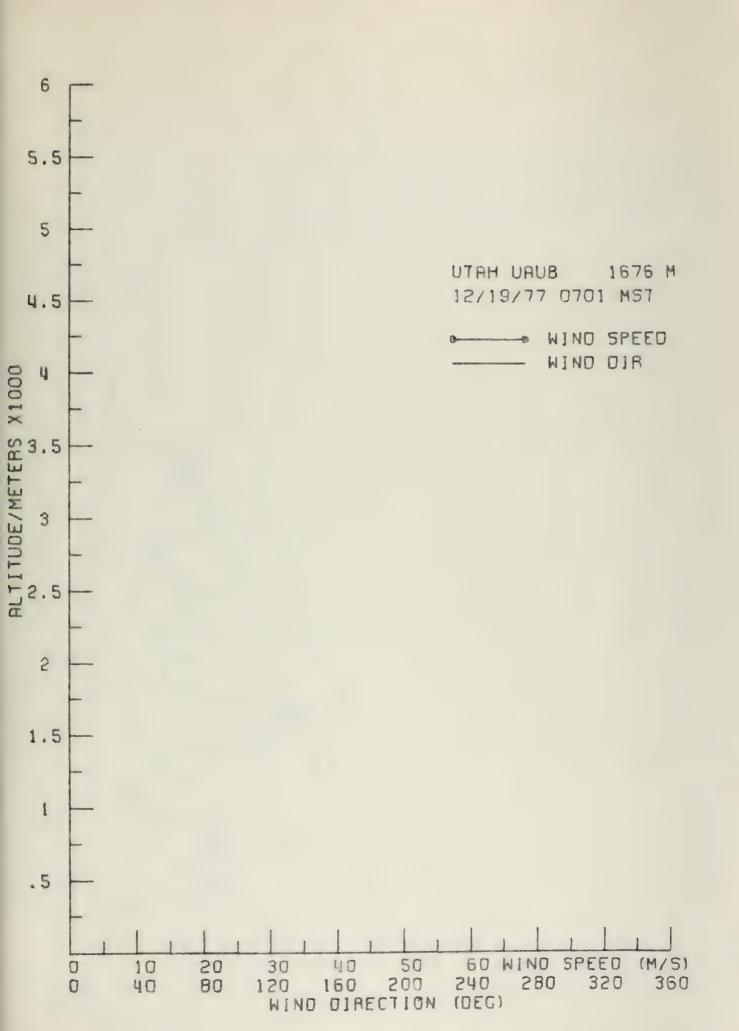




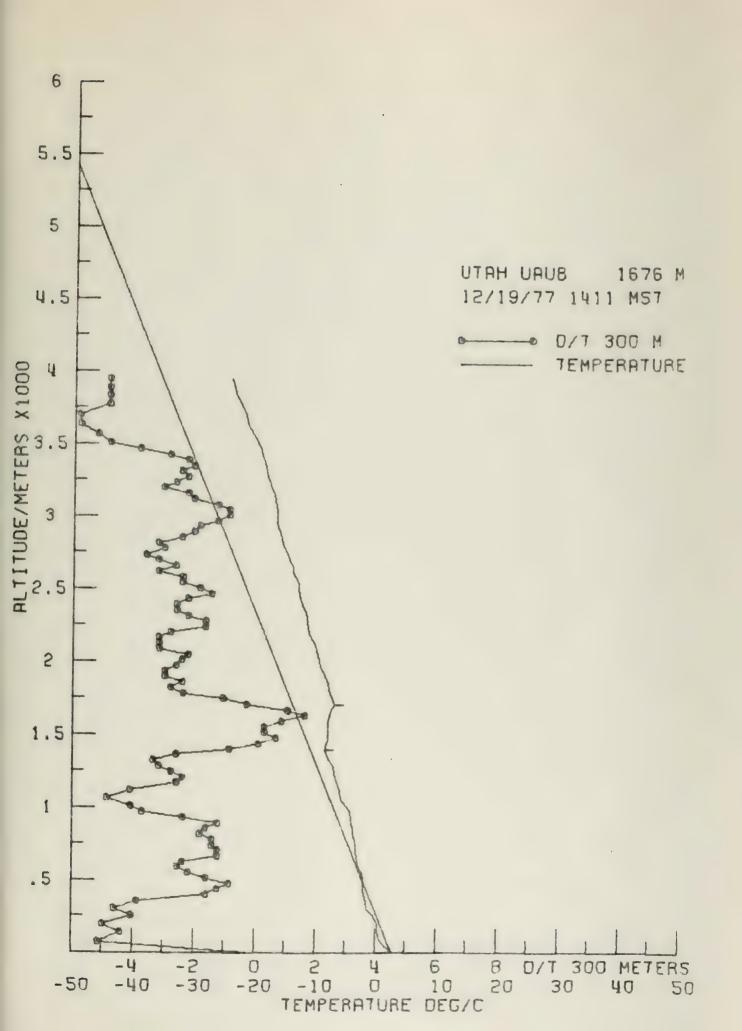




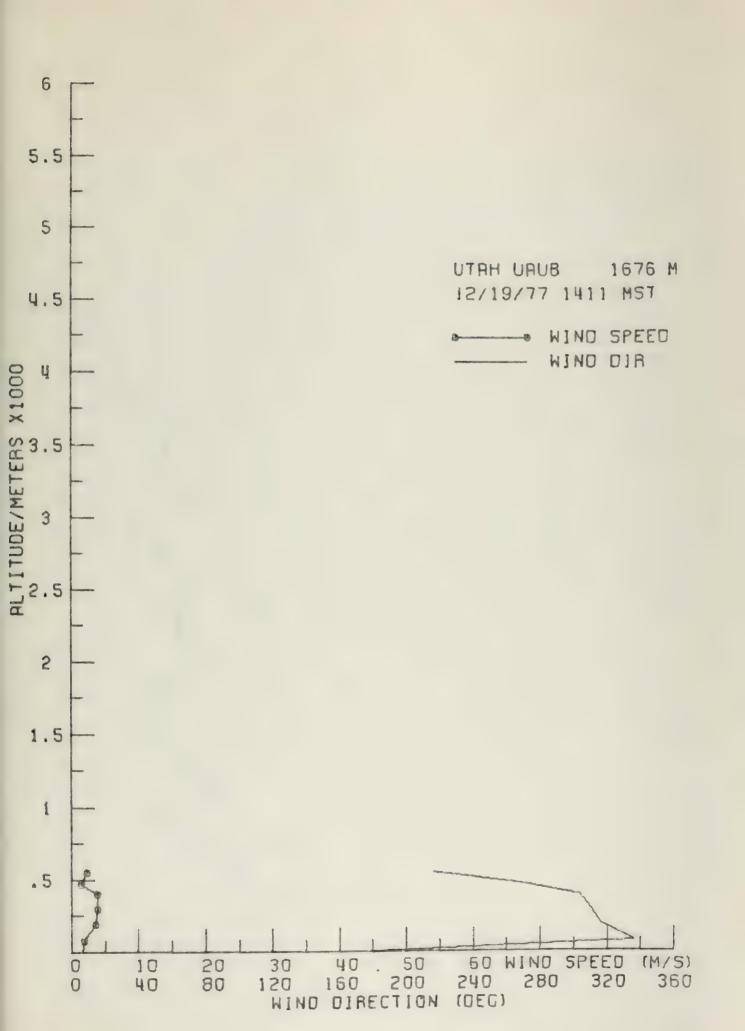




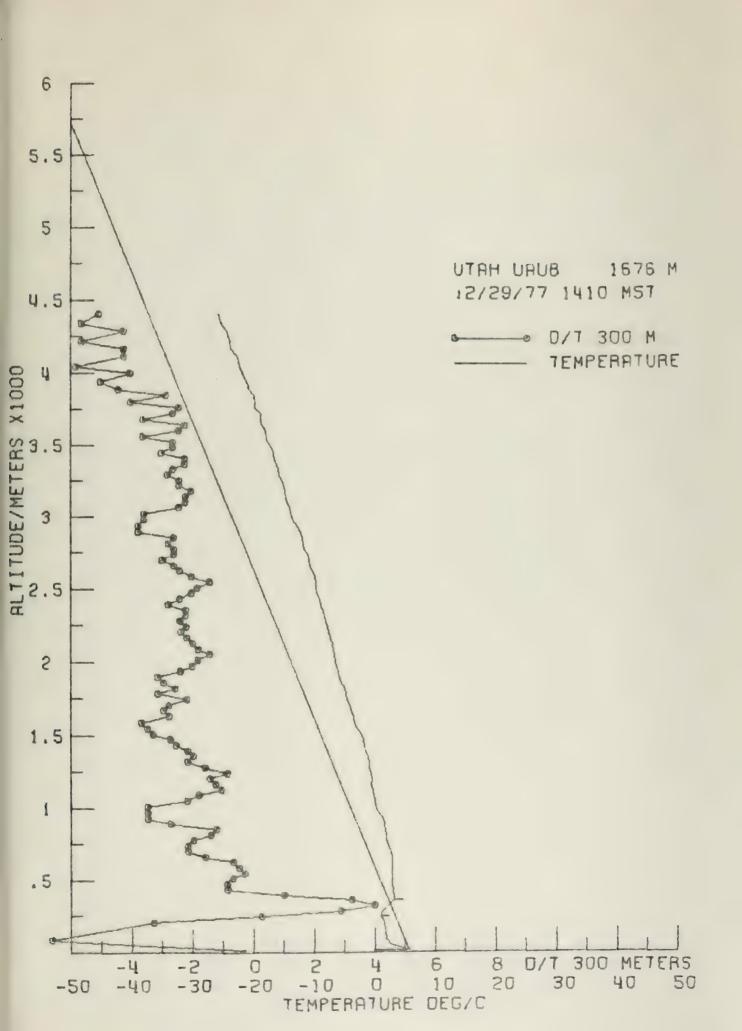


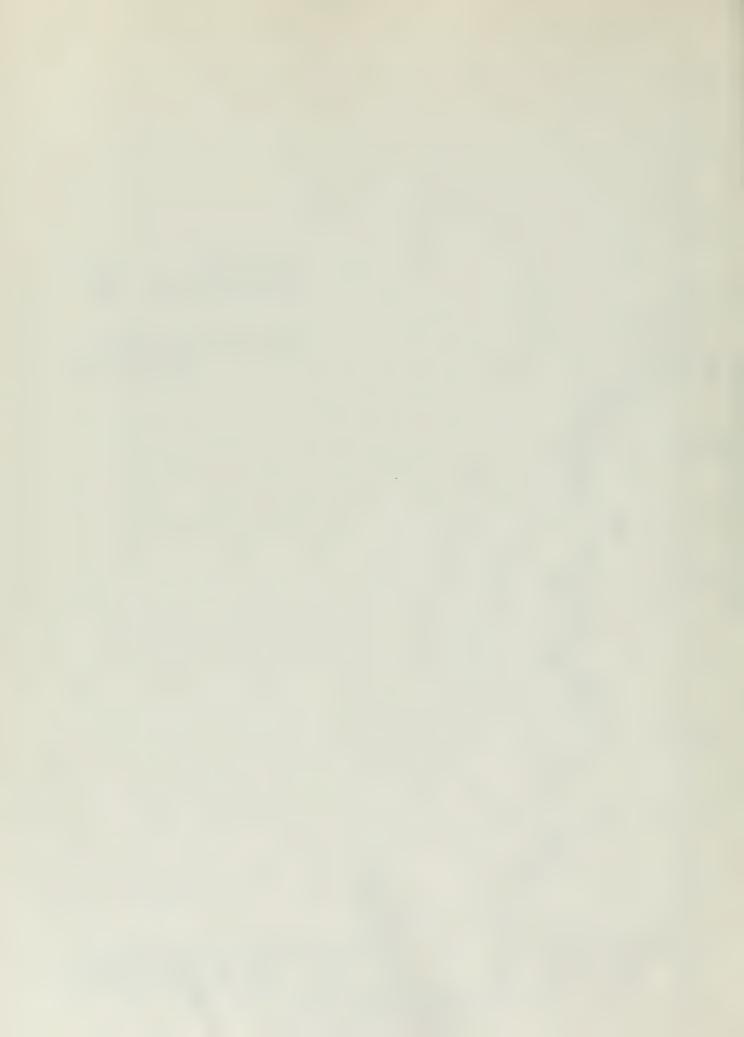


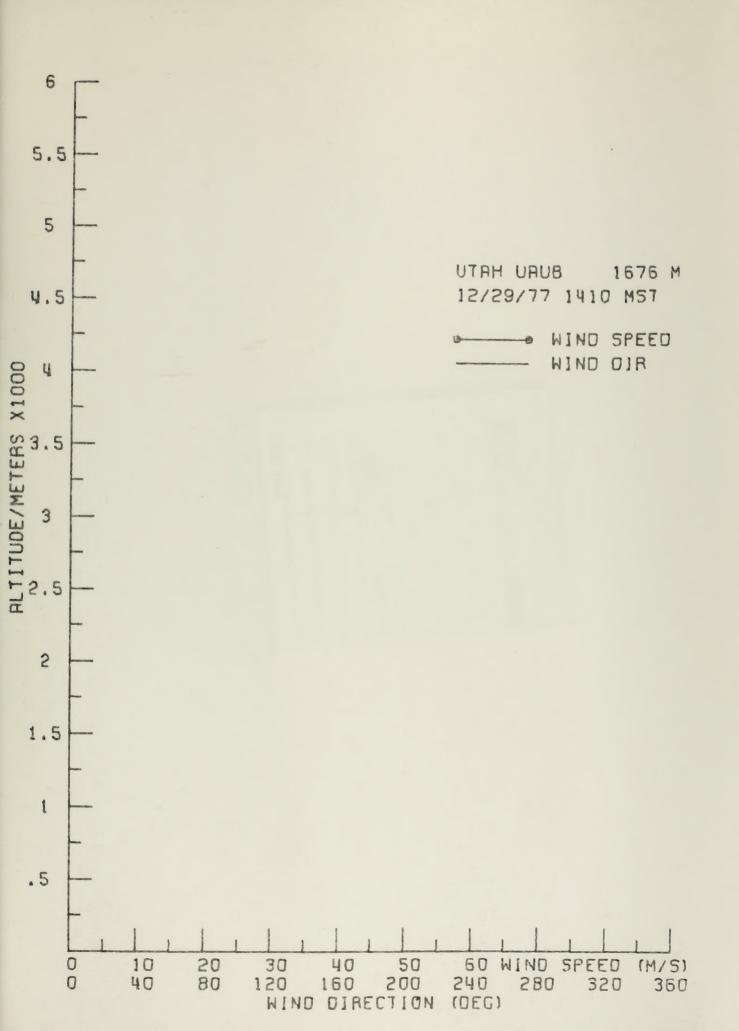












Form 1279-3 (June 1984) USDI - BLM DATE Monthly progres TN 859 .U82 W44 BORROWE BORROWER

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